DOCUMENT RESUME

ED 076 553 SP 006 483

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TITLE Accountability in Physical Education: The Effectiveness of the Elementary Physical Education Specialist.
INSTITUTION Tacoma School District 10, Wash.
NOTE 32p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Athletic Activities; *Athletic Coaches; Exercise (Physiology); Physical Characteristics; *Physical Education; *Physical Fitness; Specialists; Test Results

ABSTRACT

A total of 360 boys and girls from first through sixth grade were randomly selected and tested with an instrument developed in the Tacoma Public Schools to determine: (1) differences in physical skills and fitness performances of pupils who received the services of an elementary physical education specialist and pupils who had not; and (2) differences in physical skills and fitness performance between boys and girls. An attitudinal comparison also was made between teachers working regularly with an elementary physical education specialist and those who were not. The study found that, where differences existed, pupils who received the services of a specialist demonstrated superior performances to those who had not. In addition, pupils who had not received the services required more demonstrations of a skill before they could attempt it. Boys proved superior in jumping, running, throwing, and rope climbing skills; girls, at rope skipping. But on the whole there were very few systematic differences between them. But the study also found that teachers who worked regularly with an elementary physical education specialist rated physical education as having greater importance. (Appropriate tables are included.) (Author/JA)

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ED 076553

ACCOUNTABILITY IN PHYSICAL EDUCATION

THE EFFECTIVENESS OF THE ELEMENTARY PHYSICAL EDUCATION SPECIALIST

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Abstract

A total of 360 boys and girls from first through sixth grade were randomly selected and tested with an instrument developed in the Tacoma Public Schools, to determine: (a) differences in physical skills and fitness performance of pupils who received the services of an elementary physical education specialist and pupils who had not, and (b) differences in physical skills and fitness performance of boys and girls. An attitudinal comparison also was made between teachers working regularly with an elementary physical education specialist and those who were not. The study found that: (a) where differences existed, pupils who received the services of an elementary physical education specialist demonstrated superior performances to those who had not and those who had not also required more demonstrations of a skill before they could attempt it; (b) very few systematic differences were found between the performances of boys and girls; however, the girls generally showed consistently superior performances on most rope skipping skills and boys were superior on jumping, running, throwing, and rope climbing skills; (c) teachers who worked regularly with an elementary physical education specialist rated physical education as having greater importance.

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ACCOUNTABILITY IN PHYSICAL EDUCATION

THE EFFECTIVENESS OF THE ELEMENTARY PHYSICAL EDUCATION SPECIALIST

Stanley A. Jacobson and Richard L. Stiles*

The purposes of this study were to determine (a) differences between the performances of pupils from experimental and regular elementary schools as measured by the Elementary Skills and Fitness Test, (b) differences between the performances of boys and girls as measured by the Elementary Skills and Fitness Test, and (c) differences between the attitudes of teachers from experimental and regular elementary schools as measured by the Elementary Curriculum Rating Scale.

Background of the Study

The principals of the 42 public elementary schools in Tacoma, Washington, collectively decided to become actively engaged in providing a decision-making model for budget-connected curricular items. This undertaking was in part a result of becoming more accountable for existing educational programs, for providing leadership and insight into future expenditures of these programs and to voice a conscientious opinion for all child-centered programs based on the youngsters' needs in the elementary schools. As a result of this expressed desire, a sub-committee of the elementary principals group, namely the Elementary Principals' Physical Education Committee, met and recommended that the physical education department evaluate the worth of the 1st through 6th grade

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elementary physical education program, which had 11 specialists and one supervisor working in the program. They further stipulated that the evaluation study must provide valid data that would reflect the level of skill development and physical fitness of the elementary pupil.

All pupils in the three experimental schools received the services of an elementary physical education specialist a minimum of twice a week with follow-up lessons the other three days by the classroom teacher. Pupils in the regular schools did not receive the services of an elementary physical education specialist on a regular basis. In fact, the three regular schools selected for this study had not had the services of any elementary physical education specialist within the past two years. In these schools, the classroom teachers were solely responsible for teaching physical education.

Methodology

Subjects

The schools used in this study were selected by three elementary physical education specialists, their supervisor, and the chairman of the Elementary Principals' Physical Education Committee. Care was exercised to select schools that had pupils with very similar socio-economic and ethnic backgrounds. Roster cards at each elementary school were used as the basis of selection, with every tenth card being pulled. This process continued until five girls plus two alternates and five boys plus two alternates were selected at the first grade. Each grade level thereafter was selected in the same manner. Brothers and/or sisters and pupils who had transfered into the regular schools from experimental schools within the past year were eliminated from the study. The criteria for pupil selection was based on pupil residencey, i.e., first grade pupils must have been residents of that school from the beginning of the year; second grade pupils must have been residents of that school the first year as well as

the second year; and third through sixth grade pupils must have been residents of that school for the past two years. At each grade level 60 pupils were used--30 per group, experimental and regular, having 15 boys and 15 girls within each group. Since the study involved all six grade levels, a total of 360 pupils participated in the study.

The attitudes about the relative importance of each curricular area were obtained from the permanent staff members of both the experimental and regular schools. No effort was made to include any of the itinerant staff.

Instrumentation and Testing Procedures

(Elementary Skills and Fitness Test)

The three elementary specialists and their supervisor devised the Elementary Skills and Fitness Test, which encompassed: SELF-TESTING ELEMENTS, which included the recognition and identification of basic and advanced tumbling activities if unable to perform them; rope climbing, which involved performance of fitness and skill development; rope skipping, utilizing the long and short rope skills; RHYTHM ELEMENTS, which involved the basic locomotor skills used in most rhythms or combinations thereof, as well as basic rhythmical competencies; FITNESS ELEMENTS, which involved the 300 and 600 yard runs for primary and intermediate youngsters (cardio-respiratory endurance) plus the standing long jump for determining leg power (upper arm and shoulder girth strength was involved in the rope climb); SPORTS SKILLS ELEMENTS, which involved catching and throwing elements to determine the effectiveness of the skills basic to most sports. The laws of opposition and position of elbow in relationship to body when throwing were two main points checked. Catching was stabilized by the use of a motorized pitching machine which propelled plastic whiffle balls toward the youngster at a constant rate.

Four testing stations were established, one for each tester, and the pupils rotated from station to station in a circuit training fashion. The

testers retained the same stations throughout the study to facilitate consistency in the testing procedures. These stations were field tested in a school not included in this study. A random sampling of 387 pupils was used to determine possible flaws in the testing procedures and/or test items. The resulting stations and scoring procedures were as follows:

STATION I

1. Rope Climbing

Scissors Climb

The pupil was asked to show how to climb the rope using the basic scissors position. If a demonstration was needed, the tester explained and showed that the rope passed between the legs, the legs were then crossed, and the rope was grasped between the outsides of the feet.

0 points were given if upon demonstration the pupil was unable to perform the skills below.

1 point was given if the legs were crossed but the rope was not held with the legs.

2 points were given if the legs were crossed but the rope did not pass through the feet.

3 points were given if the legs were not completely crossed and when the rope passed between the feet the feet were not crossed but one foot rested on the other.

4 points were given if the legs were crossed, the rope was between the outsides of the feet and the legs were kept bent while climbing.

5 points were given if the legs were crossed, the rope was between the outsides of the feet and the legs were bent and straightened in a climbing action.

ROPE CLIMBING

Scissors	0	1	2	3	4	5	DEMO
Timed Climb (15 ft.) (start on back with 30 second start) Time: _____							

15 Foot Climb

The rope was marked 15 feet from the floor with tape or ink. The pupil laid in a supine position gripping the rope. Upon the command, "Go", the pupil pulled himself up and proceeded to climb the rope. The watch was stopped when the pupil touched the prescribed mark on the rope. If the pupil did not reach the prescribed mark, a visual estimate of the total feet climbed was made and recorded.

2. Long Jumping Rope

Stand and Jump

A sixteen foot plastic jump rope was used. The tester and one pupil held the ends of the rope. The pupil being tested stood in the center beside the rope. Upon turning the rope the pupil was expected to jump ten times without missing. If a miss occurred before ten jumps, another trial was allowed. The test was scored pass or fail.

Run In and Jump

The tester and one pupil held the ends of the rope. The pupil being tested stood outside the turning rope. The rope was turned front door, that is, the rope turned down toward the pupil. The pupil was to run in within five turns of the rope and jump ten times without missing. If a miss occurred before ten jumps, another trial was allowed. The test was scored pass or fail.

SKIPPING ROPE

Long Rope	YES	NO	DEMO
Stand and Jump (10 times) 2 tries			
Run and Jump (Front Door) 2 tries			

3. Standing Long Jump

Each pupil was given two trials with the better of the two jumps being recorded. The pupil was measured to that part of his body closest to the take-off line. (This was usually the heel, but if a person fell back, it was that part of the body, hand, seat, that was closest to the line.) The pupil was to take off on both feet at the same time and land both feet at the same time.

LEG POWER

Standing Long Jump (Inches) _____

STATION II

1. Throwing

a. Pupils were told to throw five overhand throws and make sure to step forward on each throw. The instructor gave one demonstration to each pupil.

b. The ball was thrown to instructor, who looked for the following points:

(1) Opposition. Did the pupil use the principle of opposition? (Left foot forward, right arm back).

(2) Elbow. Did the pupil bring the arm back behind the shoulder and away from the body, or was the ball thrown by keeping the arm in front and/or close to the body?

(3) The score was the correct number of times the pupil showed proficiency in the points mentioned above.

2. Catching

a. A pitching machine used.

b. The pupil stood 20 feet away, facing the pitching machine.

c. Three practice trials were given plus five scored trials for recording purposes.

d. The score indicated the number of times the pupil was able to catch the ball with the hands and not the body.

CATCHING/THROWING

Correct Throws (Overhand) 1. Opposition 2. Elbow	0	1	2	3	4	5
Catching (20 feet)	0	1	2	3	4	5

STATION III

Tumbling

The tumbling test area was separated and partitioned off from the other testing areas. The small group of pupils who were not being tested on tumbling were kept away from the area until called.

A. Basic Tumbling Skills

Forward Roll

The pupil entered the testing area and was asked to go to the mat and do the best possible forward roll. If the pupil did not know what a forward roll was, a short verbal description was given. If the pupil still did not understand what a forward roll was, the tester would physically demonstrate the stunt. This procedure was followed on each of the basic test items: forward roll, backward roll, headstand, and cartwheel.

The stunt was judged on the following point system:

0 points were given if upon demonstration the pupil was unable to perform the skill below.

1 point was given for starting from the proper position: feet and knees together, hands placed on the mat with the fingers pointing straight ahead.

2 points were given for tucking head down toward the knees and rolling on the shoulders (instead of on the head).

3 points were given for rolling over and getting on the feet in one motion with the legs tucked.

4 points were given for executing all the basic parts of the roll and getting up without the use of the hands.

5 points were given for executing all the basic parts of the roll, as above, with overall good form, i.e., knees together, feet together, and the move had smooth continuity.

Backward Roll

0 points were given if upon demonstration the pupil was unable to perform the skills below.

1 point was given for correct starting position, i.e., back to the mat, squat position, feet together.

2 points were given for rolling backward, touching the buttocks to the mat first and placing the hands correctly on the mat, i.e., hands over the shoulders with the fingers pointing at the shoulders.

3 points were given for rolling over backwards and at least landing on the knees.

4 points were given for rolling over backwards, pushing with the hands and clearing the head and landing on the feet.

5 points were given for executing the stunt with overall style and grace.

Headstand

0 points were given if upon demonstration the pupil was unable to perform the skills below.

1 point was given for placing the head on the mat correctly, i.e., forehead (hairline) contacted the mat, and not the top of the head.

2 points were given for either getting into a tripod stand, i.e., balancing on the head with the knees resting on the elbows and feet in the air, or for getting the knees and feet off the ground in a tucked position.

3 points were given for getting the feet above the head for any length of time with the motion under control.

4 points were given for keeping the feet above the head for five seconds.

5 points were given for executing the movement with overall grace and the body alignment straight from the head up to the feet with the toes pointed in the direction of alignment.

Cartwheel

0 points were given if upon demonstration the pupil was unable to perform the skills listed below.

1 point was given for proper hand placement on the mat, i.e., both hands pointed sideways perpendicular to the edge of the mat. In a cartwheel, first one hand contacts the mat and the second hand touches the mat a fraction of a second later.

2 points were given for making a hard kick with the first leg to go into the air with the feet above the head.

3 points were given for getting both feet into the air over the head and landing on the feet.

4 points were given for executing a cartwheel with the legs straight above the head, and ending in an upright position (hand, hand, foot, foot sequence).

5 points were given for performing the cartwheel with perfectly

straight legs, pointed toes, and good body alignment from the head to the pointed toes.

B. Advanced Tumbling Skills

On the second part of the tumbling section the tester asked the pupil if he could perform the stunt, e.g., round-off. If the pupil said yes, he was asked to execute the stunt. The same routine applied to all of the stunts in the advanced tumbling skills section. If the pupil indicated he had heard of the stunt (cognitive recognition) but could not perform it, he was asked to describe the stunt (identification). If he did not recognize the names of the stunts, he was asked to look at 8½ x 11 inch pictures of the stunts and identify them.

This section was judged differently from the basic tumbling skills since the stunts were more complex. On these skills, the performer was given five points before he performed the skill and one-half point was deducted for each fault executed during his performance. The points deducted were based on the following criteria:

a. Proper hand placement when first contacting the mat.

b. Shoulder extension which assured proper body alignment.

c. Legs, knees and feet together and straight.

d. Body position during the stunt. (The front handspring and back handspring called for an arch in the back, the round-off and walking on the hands called for straight body alignment.)

e. Good landing or finishing positions.

f. Overall grace and fluidity used during the execution.

TUMBLING							DEMO	
Forward Roll	0	1	2	3	4	5		
Backward Roll	0	1	2	3	4	5		
Headstand	0	1	2	3	4	5		
Cartwheel	0	1	2	3	4	5		
Identify and/or Do:							I.D.	
Round-Off	0	1	2	3	4	5		
Front Handspring	0	1	2	3	4	5		
Back Handspring	0	1	2	3	4	5		
Hand Walk (1 mat)	0	1	2	3	4	5		

STATION IV

1. Locomotor Skills

Pupils were asked to remain in a separate room while each person was tested independently. This allowed no chance for any visual or auditory input or cues regarding the correctness or incorrectness of the activity. Pupils were also advised not to discuss their performances with others after being tested. The activities were:

Walk to Music

Pupil was instructed to listen to the music and upon hearing the beat, or rhythm, begin to "march" to the music. The use of the cue word "march" elicited more correct responses regarding the actual timing to music than if the word "walk" to the music was used.

Skip

Pupil was asked to skip across the room and back again (combination of step and hop on each foot).

Hop

Pupil was asked to show the examiner how to hop. (Taking off on one foot and landing on same foot).

Jump

Pupil was asked to show the examiner how he or she could jump. The placement of the hop was purposely inserted ahead of the jump. If

a youngster mistakenly performed the jump (two feet) for the hop (one foot) it revealed an apparent lack of knowledge of the difference between the two. Most responses to the hop were on two feet. (This would refer to the misnomer, "Bunny Hop".)

Leap

Pupil was asked to show how he or she could leap (transfer of body weight from one foot to the other and incorporating elevation).

Gallop

Pupil was asked to show how he or she could gallop. (In stepping fashion forward, the same lead foot--left or right--was used while pushing foot--trailing foot--was brought near in line with lead foot and pattern was repeated.)

Slide

Pupil was asked to show how he or she could slide. Individual interpretation of slide (relating to locomotor movements) was quite varied. (Slide was judged as moving sideways with the same lead foot that initiated the movement, i.e., same as a gallop, only sideways.)

LOCOMOTOR SKILLS

	YES	NO	DEMO
Walk (To Music)			
Skip			
Hop			
Jump			
Leap			
Gallop			
Slide			

2. Short Jump Rope

Pupils were asked to pick up the rope and demonstrate the two-foot basic step. If a demonstration of the skill was necessary, the tester remained in his chair and demonstrated from a seated position the foot positioning and action.

Two foot basic step

With feet together, the pupil was to jump over the rope as it passed under the feet (big jump) and to take a preparatory rebound (little jump) while the rope was overhead (called double time). Some youngsters from experimental schools inquired, "What speed, slow time, double time, or fast time?"

Alternating step

As the rope passed under the feet, the weight was to be shifted alternately from one foot to the other, raising the unweighted foot in a running position (double time).

Rocker step (left and right)

One leg was to be always forward in a walking stride position. As the rope passed under the feet the weight was to be shifted from the back foot to the forward foot. The rebound (little jump) was to be taken on the forward foot while the rope was above the head. On the next turn of the rope the weight was to be shifted from the forward foot to the back foot, repeating the rebound on the back foot (double time). Performance was based on pass-fail and whether or not a demonstration of the skill was necessary.

SHORT JUMP ROPE

	YES	NO	DEMO
Short Rope Two foot basic			
Alternating step			
Rocker step (left and right)			

STATION V

Distance Run

After a 30-year square was measured and traffic cones were placed at the corners of the square, pupils were lined at one corner in position to run.

A. Grades 1-2-3

Pupils were asked to run 2½ times around the cones and to cover the

distance in the shortest possible elapsed time. Times were read aloud by one instructor as pupil passed finish line, and recorded by another instructor.

B. Grades 4-5-6

Pupils were asked to run 5 times around the cones in the shortest possible elapsed time. Times were read aloud by one instructor as pupil passed finish line, and recorded by another instructor.

ENDURANCE

300 Yard Run (1-3) Time _____
600 Yard Run (4-6) Time _____

(Elementary Curriculum Rating Scale)

A measure of the elementary teachers' attitudes regarding physical education relative to other curriculum areas was obtained from the Elementary Curriculum Rating Scale. The scale (see Figure 1) was developed by randomly listing the ten curriculum areas. The teachers were to rate each area on a scale of 1 to 10, i.e., 1 represented a "least important" rating; 10 a "most important".

Insert Figure 1 about here

Statistical Analyses

Where the data were presented in the form of scaled values, a 2 x 2 analysis of variance was used to test the differences between: treatment and regular pupils; boys and girls; and treatment x sex interaction. The differences between data in the form of proportions were tested against a z distribution or critical ratio. Groups (e.g., boys and girls from experimental schools formed an "experimental" group) were pooled so that proportional comparisons could be made.

Results

Tumbling Skills

The data on the psychomotor performances of the Basic Tumbling Skills are presented in Table 1. On each of the four basic tumbling skills (i.e., "forward roll", "backward roll", "head stand" and "cartwheel") tested, the psychomotor performances of pupils in every grade (1st, 2nd, 3rd, 4th, 5th and 6th) from the experimental schools were significantly better than the performances of pupils from the control or regular elementary schools. It appeared that by the second grade pupils from the experimental schools had mastered the basic tumbling skills. This might imply that the more advanced tumbling skills could be successfully implemented into the primary level curriculum. Of the 24 cells tested (i.e., four different tumbling skills at six grade levels), 20 had differences between the experimental and regular pupils which were significant at the $p < .001$ level. The superiority of the experimental pupil performances was further substantiated through the need for the regular pupils in the first five grades to have a significantly greater number of "forward roll" demonstrations before they could proceed with the tumbling tasks.

Insert Table 1 about here

Reliable, systematic performance differences were not generally found to exist between boys and girls on the basic tumbling skills. The exception to this finding was the superior "cartwheel" performances at the 2nd, 5th and 6th grades by the girls. There was no significant difference in the number of times a basic tumbling skill had to be demonstrated to boys or girls before they could proceed with the performance of the skill.

Significant interaction effects were found in only three of the 24 cells tested for performance differences (NB, since a proportional *t* test was used

to test the amount of a group that needed a demonstration, interaction effects were not tested).

The data in Table 2 display the results of similar testing of the Advanced Tumbling Skills (i.e., "round-off", "front handspring", "back handspring", and "handwalk"). Reliable performance differences were found between the experimental pupils and regular pupils at the intermediate grades (4th, 5th and 6th grades). Experimental pupils were superior in their performance of the "round-off", "front handspring", and "handwalk" with the differences on the "handwalk" skill also significant at the 2nd and 3rd grades. However, a reliable performance difference on the "back handspring" was not evidenced until the 6th grade. This attested to the teaching of the normal progression of gymnastic skills practiced by the experimental schools.

Insert Table 2 about here

There were no significant differences between experimental and regular pupils in their ability to correctly identify the "handwalk" skill. However, the experimental pupils in the 3rd through the 6th grades were able to correctly identify the "round-off", "front handspring" and "back handspring" more often than were the regular pupils. In addition, at the 2nd grade level the experimental pupils were able to identify the "round-off" and "back handspring" more often than were the regular pupils. An explanation of the difference might be associated with the observation that in the experimental schools there seemed to be a greater sense of helping each other to master the tumbling stunts as compared with the regular schools.

Inconsistent significant differences were observed between the performances of the boys and girls on the advanced tumbling skills (i.e., girls at the 4th and 5th grade levels were able to perform the "round-off" better than the boys, and at the 5th grade they were also able to identify the "round-off" with greater proficiency than the boys; however, at the 4th grade level the reverse

was true with the boys more able to identify the "round-off" than were the girls). In addition, significant interaction effects were obtained on the "round-off" performances at the 4th and 5th grades.

Long and Short Rope Skipping Skills

Tests were made of the proportion of a group which successfully completed a rope skipping task and the proportion of a group needing a demonstration of a rope skipping task. The results are presented in Table 3. Only one difference was found to be significant between experimental and regular pupils on the long rope skipping tasks. The difference noted favored the experimental pupil on the "run and jump" task at the 4th grade level. The differences in the proportion of experimental or regular pupils that needed a demonstration of any long rope skipping task were not significant. A possible reason why few differences were observed is that rope skipping is more universally practiced and taught than the other skills tested. However, as the rope skipping tasks became more specific (i.e., progressed to short rope skipping tasks) training effects from the experimental schools proved to produce more proficient performances.

Insert Table 3 about here

With the exception of the "two foot basic" at the 5th grade level and the "alternating" at the 3rd grade level, significant differences were found at the 3rd, 4th, 5th, and 6th grade levels on the four short rope skills (i.e., "two foot basic", "alternating", "left rocker step" and "right rocker step"). In all these cases the performances of the experimental pupils were superior to the regular pupils. In addition, a significant difference was found at the 2nd grade level on the "left rocker step". These results were further substantiated (with the exception of the "two foot basic" at the 3rd grade level) with significantly more regular pupils requiring a rope skipping skill demonstration

in grades 2-6 than was needed by the experimental pupils on the four short rope skipping skills. In addition, the pupils from the experimental schools would position themselves (i.e., they would face the rope turner) so that visually they would get a better sense of timing.

Girls performed consistently better than boys on both long rope skipping tasks. The girls performed significantly better than boys on the four short rope skipping tasks at all grade levels with the exception of the "two foot basic" at the 4th and 6th grades, the "left rocker step" at the 5th and 6th grades, and the "right rocker step" at the 1st, 3rd, 5th and 6th grades. The superior performances of the girls could be explained through a "cultural" phenomenon, i.e., girls practice this skill area more than boys. Even though their performance was poorer generally, the boys did not require more demonstrations of the skills than the girls before they could attempt a task. They cognitively knew the task expected of them but could not perform the task adequately. Only at the 2nd grade level on the "two foot basic" did significantly more boys than girls need a demonstration of the rope skipping task.

Locomotor Skills

In Table 4 the performance results on the Locomotor Skills are presented. Of the 42 cells tested (i.e., 7 skills at 6 grade levels), 18 had significantly greater proportions of experimental pupils who were able to successfully complete the locomotor tasks than were regular pupils. On two of the 7 tasks (i.e., the "skip" and the "jump" tasks) no significant differences were found between the number of experimental pupils successfully completing the tasks. Fairly consistent differences favoring the experimental pupils were found (with the exception of the "gallop" task at the 2nd grade level) on the last two locomotor skills, the "gallop" task and the "slide" task for all grades, 1st through 6th.

Insert Table 4 about here

When testing for locomotor performance differences due to differences in sex, only spurious differences were found (i.e., more girls than boys were able to successfully complete the "walk to music" task at the 3rd grade, "skip" task at the 5th grade, and "gallop" task at the 3rd grade).

Rope Climbing Skills

The results of the rope climbing tasks are presented in Table 5. The differences between groups were tested both on their ability to perform the task and the amount of demonstration they needed in order to approach performing the "scissors" rope climbing task. At each of the six grade levels, more of the experimental pupils were able to do the "scissors" and with fewer demonstrations needed than were the regular pupils. In addition, significantly more experimental pupils in grades 4, 5 and 6 were able to climb to the criterion of 15 feet than were regular pupils. This finding might suggest that lower level rope climbing skills should be developed and implemented into the primary curriculum. Another test of the data found that only at the 6th grade level was a significant difference found in the amount of total feet climbed and this favored the experimental pupils.

Insert Table 5 about here

The effects of sex differences on performance of rope climbing skills were tested. Only at the 5th grade level was a significant difference found on the "scissors", with boys more able than girls to successfully complete the task. However, no significant differences were found in the number of "scissors" demonstrations needed to approach the task of performing the rope climbing skill. It was found that at the 1st, 3rd, 4th, and 5th grade levels more boys than girls were able to climb to the criterion of 15 feet. However, only at the 4th grade level did boys climb significantly more feet as a group than did the girls.

Endurance Skills

The endurance performance (i.e., "300 yard run" for grades 1-3 and "600 yard run" for grades 4-6) differences between experimental and regular pupils are presented in Table 6. Significant treatment differences were noted at the 5th and 6th grades where the experimental pupils ran faster than the regular pupils, whereas in grades 1-4 no significant treatment differences were found. A test of the effects of sex differences in performance found the boys making their respective grade level endurance runs significantly faster than the girls except at the 2nd grade level where no significant differences were found. No significant interaction effects were found at any of the grade levels.

Insert Table 6 about here

Leg Power Skills

Table 7 displays the results of a test of the Leg Power "standing long jump" performance differences between experimental and regular pupils. Significant differences--all of which favored the experimental pupils--were found at the 1st, 4th, 5th and 6th grade levels. Boys showed superior performance to girls at the 1st, 3rd and 4th grade levels and no significant interaction effects were found at any grade level.

Insert Table 7 about here

Throwing and Catching Skills

A test was made of the Throwing and Catching performance differences between experimental and regular pupils (see Table 8). Correct "opposition" differences were noted at the 1st and 3rd grades and correct "elbow" positioning differences were found at the 1st, 3rd, and 4th grade levels for the

throwing skills. In these cases the experimental pupils were more correct in their throwing skills than were the regular pupils. This was also true for the significant differences in catching skills noted at the 4th and 5th grade levels.

Insert Table 8 about here

Consistent differences were noted on both aspects of the throwing task in grades 1-4. In all eight instances the performance of the boys was superior to that of the girls and at the 1st, 2nd and 4th grade levels there was significant treatment X sex interaction.

At the 4th and 5th grade levels significant differences were noted favoring the performances of the boys. No significant interaction effects were noted on the "catching" task. This might suggest that insufficient time was spent on sports skills in the experimental schools, or that the regular school physical education programs were strongly sports oriented.

Curriculum Rating Scale

Tests were made of ratings from both experimental and regular school teachers. The general results are reported in Table 9. The ranking that each curricular area attained from regular school teachers as to its relative importance in the elementary education program had a one-to-one correspondence with the rankings made by experimental school teachers with one notable exception: the physical education curricular area with its mean rating of 5.89 and 8th place ranking made by regular school teachers moved to a 4th place ranking with a mean of 7.58 made by experimental school teachers. The difference between these two mean ratings was significant ($p<.001$). However, in similar comparisons of the mean ratings of other curricular areas, significant differences were not found. This finding would seem to have implication both

for employing curriculum specialists and a means of using them in physical education, as well as in other curricular areas.

Insert Table 9 about here

Summary

The results of this study found that in every instance where significant differences existed, the pupils from the experimental schools displayed performances which were superior to the performances of pupils from the regular schools. In addition it was found that in no case did a significantly greater number of pupils from the experimental schools require a demonstration of a skill before they could attempt it, whereas in many instances the pupils from the regular schools did require such a demonstration.

Very few systematic differences were observed between the performances of girls and boys. Generally, girls displayed consistently superior performances on most of the Rope Skipping Skills as well as some fairly consistently superior performances of the "cartwheel" task in the Basic Tumbling Skills. On the other hand, the boys showed consistently superior performances on the 15 foot Rope Climb, Endurance (running) Skill, and Throwing Skills. Fairly consistent superior performances of Leg Power (standing long jump) were also accomplished by the boys.

In a comparison of rankings derived from the ratings of curricular areas by teachers from both the experimental and regular schools, it was found that the only significant difference was in the physical education area. Physical education was rated as having greater importance in the experimental schools.

Figure 1

ELEMENTARY CURRICULUM RATING SCALE

Please circle the number which best indicates the relative importance you feel each of the curricular areas listed below has in the elementary education program. Please rate <u>all</u> curriculum areas.

	Most Important									Least Important
READING	10	9	8	7	6	5	4	3	2	1
SCIENCE	10	9	8	7	6	5	4	3	2	1
MUSIC	10	9	8	7	6	5	4	3	2	1
HEALTH	10	9	8	7	6	5	4	3	2	1
PHYSICAL EDUCATION	10	9	8	7	6	5	4	3	2	1
LANGUAGE ARTS	10	9	8	7	6	5	4	3	2	1
SOCIAL STUDIES	10	9	8	7	6	5	4	3	2	1
MATHEMATICS	10	9	8	7	6	5	4	3	2	1
SPELLING	10	9	8	7	6	5	4	3	2	1
ART	10	9	8	7	6	5	4	3	2	1

The responses you have made to this rating scale will be treated in a confidential manner. Thank you for your cooperation.

Table 1

Levels of Significance Obtained on Basic Tumbling Skills

	Performance						Demonstration Needed					
Grade Level:	1	2	3	4	5	6	1	2	3	4	5	6
Treatment Differences Effects												
Forward Roll	*	***	***	***	***	***	***	***	***	*	*	
Backward Roll	***	***	***	***	***	***	***					
Headstand	*	***	***	***	***	***						
Cartwheel	*	***	*	***	***	***		**				
Sex Differences Effects												
Forward Roll									b*			
Backward Roll												
Headstand				b*								
Cartwheel		g**			g*	g*						
Treatment X Sex Interaction Effects												
Forward Roll												
Backward Roll		*										
Headstand												
Cartwheel		***		*								

* = $p<.05$
** = $p<.01$
*** = $p<.001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 2

Levels of Significance Obtained on Advanced Tumbling Skills

	Performance						Demonstration Needed					
Grade Level:	1	2	3	4	5	6	1	2	3	4	5	6
Treatment Differences Effects												
Round-Off				**	***	**		*	**	***	***	***
Front Handspring				*	**	***			**	***	***	***
Back Handspring						*		***	***	***	***	***
Hand Walk (1 mat)		*	**	**	**	***						
Sex Differences Effects												
Round-Off				g*	g**					b*	g**	
Front Handspring												
Back Handspring												
Hand Walk (1 mat)												
Treatment X Sex Interaction Effects												
Round-Off				*	**							
Front Handspring												
Back Handspring												
Hand Walk (1 mat)												

* = $p < .05$
** = $p < .01$
*** = $p < .001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 3

Levels of Significance Obtained on Rope Skipping Skills

	Performance						Demonstration Needed					
Grade Level:	1	2	3	4	5	6	1	2	3	4	5	6
Treatment Differences Effects												
Long Rope												
Stand and Jump												
Run and Jump				***								
Short Rope												
2 Foot Basic			*	**		**		*		**	***	***
Alternating				**	***	***		**	*	***	***	***
Rocker Step - L		**	*	**	***	***		***	***	***	***	***
- R			**	***	***	***		**	***	***	***	***
Sex Differences Effects												
Long Rope												
Stand and Jump	g***	g***	g*	g***	g***	g**						
Run and Jump	g***	g***	g**	g***	g***	g*						
Short Rope												
2 Foot Basic	g***	g***	g*		g**			g*				
Alternating	g***	g***	g***	g***	g***	g*						
Rocker Step - L	g*	g**	g*	g**								
- R		g**		g*								

* = $p<.05$
** = $p<.01$
*** = $p<.001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 4

Levels of Significance Obtained on Locomotor Skills

	Performance					
Grade Level:	1	2	3	4	5	6
Treatment Differences Effects						
Walk (To Music)	**	***			*	
Skip						
Hop				**	*	
Jump						
Leap			**			***
Gallop	*		**	**	**	***
Slide	*	***	***	***	***	***
Sex Differences Effects						
Walk (To Music)			g**			
Skip					g*	
Hop						
Jump						
Leap						
Gallop			g*			
Slide						

* = $p<.05$
** = $p<.01$
*** = $p<.001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 5

Levels of Significance Obtained on Rope Climbing Skills

	Performance						Demonstration Needed					
Grade Level:	1	2	3	4	5	6	1	2	3	4	5	6
Treatment Differences Effects												
Scissors	**	*	**	**	***	***	***	***	***	***	***	***
Total amount of feet climbed						**						
No. that climbed 15 feet				*	**	**						
Sex Differences Effects												
Scissors					b***							
Total amount of feet climbed				b**								
No. that climbed 15 feet	b*		b*	b*	b**							

* = $p < .05$
** = $p < .01$
*** = $p < .001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 6

Levels of Significance Obtained on Endurance Skills

	Performance					
Grade Level:	1	2	3	4	5	6
Treatment Differences Effects						
300 Yard Run (1-3)						
600 Yard Run (4-6)					**	**
Sex Differences Effects						
300 Yard Run (1-3)	b*		b***			
600 Yard Run (4-6)				b***	b***	b***
Treatment X Sex Interaction Effects						
300 Yard Run (1-3)						
600 Yard Run (4-6)						

* = $p<.05$
** = $p<.01$
*** = $p<.001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 7

Levels of Significance Obtained on Leg Power Skills

Grade Level:	Performance 1	2	3	4	5	6
Treatment Differences Effects						
Standing Long Jump (Inches)	**			***	***	***
Sex Differences Effects						
Standing Long Jump (Inches)	b*		b**	b**		
Treatment X Sex Interaction Effects						
Standing Long Jump (Inches)						

* = $p<.05$
** = $p<.01$
*** = $p<.001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 8

Levels of Significance Obtained on Catching/Throwing Skills

Grade Level:	Performance 1	2	3	4	5	6
Treatment Differences Effects						
Correct Throws (Overhand) - Oppos	**		*			
- Elbow	**		*	***		
Catching (20 feet)				*	**	
Sex Differences Effects						
Correct Throws (Overhand) - Oppos	b**	b***	b**	b**		
- Elbow	b***	b***	b*	b***		
Catching (20 feet)			b**		b***	
Treatment X Sex Interaction Effects						
Correct Throws (Overhand) - Oppos						
- Elbow	*	*		***		
Catching (20 feet)						

* = $p<.05$
** = $p<.01$
*** = $p<.001$
g = girls were significantly better than boys
b = boys were significantly better than girls

Table 9

The Perceived Relative Importance of Each Curricular Area in the Elementary Education Program

Curriculum Areas (as listed on the Curriculum Rating Scale)	Regular Teacher Ranking	Regular Teacher Mean Ratings	Experimental Teacher Ranking	Experimental Teacher Mean Ratings	Level of Significance of Difference in Mean Values
Reading	1	10.00	1	9.85	n.s.
Science	7	6.23	8	6.39	n.s.
Music	9	5.18	9	5.79	n.s.
Health	6	6.31	7	6.48	n.s.
Physical Education	8	5.89	4	7.58	.01
Language Arts	3	8.68	3	8.47	n.s.
Social Studies	5	7.00	6	6.67	n.s.
Mathematics	2	9.42	2	9.18	n.s.
Spelling	4	7.69	5	7.36	n.s.
Art	10	5.10	10	5.45	n.s.

(NB, the results in this table were based on a 10-point scale, i.e., 10 meaning most important to 1 meaning least important)